One: Relatively low customer density suggests that there may be greater economies of scope with existing communications networks in rural areas. By encouraging rural telephone companies to build out the PCS networks in their wireline service areas, rural customers may obtain benefits of PCS that would otherwise take years to bring to rural America.

Further, by maximizing the inner-workability of rural PCS, cellular, and telephone networks, for example, network costs may be reduced in the range of wireless services enhanced. In this context, restrictions on ownership of cellular and PCS would be bad for customers in rural areas.

Also, limitations on transmitter power and requirements for population coverage are important drivers of costs in rural areas because of the relatively low subscriber density.

Relaxation of such requirements or adoption of policies which offset these requirements may bring more affordable PCS to rural areas.

Bringing PCS to pockets of demand economically may also require creative use of technology, such as dual

mode, cellular, and PCS phones.

Also, in order to increase subscribership to PCS, thereby reducing the average unit cost, the Commission may want to explore flexible ways to integrate PCS with wireline telephone systems.

In summary, there is significant demand per rural citizen for the enhanced services promised by PCS. There's just less demand per unit of geography. The demand and supply characteristics for rural PCS suggest the need for regulatory policies tailored to rural areas.

Thank you.

DR. PEPPER: Thank you very much.

Mr. Hamilton.

ELLIOTT HAMILTON

VICE PRESIDENT AND DIRECTOR

U.S. WIRELESS CONSULTING MTA/EMCI

MR. HAMILTON: Thank you. My name is Elliott
on. I'm the Vice President and Director of the U.S.
ess Consulting at MTA/EMCI.

Since 1987, EMCI has consulted to cellular
ing, SMR, and mobile satellite carriers on the service
chnology demand and service issues.

More recently, EMCI has consulted to cellular
carriers, new PCS carriers, and other interested parties
concerning PCS service definitions, market demands,
strategic plans, and optimal system design.

EMCI recently coauthored this year a 47-volume
study with Moffitt, Larson, and Johnson, titled, "PCS
Market Demand and System Engineering".

EMCI projects that the total U.S. mobile
telephone voice market will reach 87 million subscriptions
by 2004. Our demand methodology is based on our ongoing
research, including quarterly surveys of 1,000 consumers;
focus groups, including quantitative techniques, such as
conjoint analysis; studies of product diffusion curves
based on other consumer products; nonlinear trending of
mobile radio growth in existing mobile markets, and
analysis of the cross-competitive nature of future markets

based upon evolving technologies and consumer preferences.

Our forecasts are based upon several key assumptions and market developments. These include:

Licensing of new PCS carriers by the end of 1994; limited use of PCS as a bypass technology in the first five years.

The forecasts recognized the development of unlicensed applications but do not include counts of these users.

The average monthly bill is assumed to fall between $40 and $50 per month.

Usage is forecast to be somewhat higher than today's average usage levels, due to the impact of lower price levels and usage price elasticities.

Of the 87 million voice subscribers, EMCI projects 57 percent to be on cellular systems, 32 percent to be on PCS systems, and 12 percent to be on digital SMR systems.

There will be a likely significant overlap in the subscriptions, particularly between business purchase, mobile services and personal mobile services.

One area of potential differentiation for new

PCS carriers is the marriage of the license and unlicensed applications. EMCI projects that a critical application of the unlicensed bands will be wireless PBX. The allocation of frequency for unlicensed applications, adjacent to the licensed PCS bands, will create the opportunity for multi-mode handsets, permitting both private and wireless PBX and public license operations.

In survey research, EMCI finds that 7 percent of existing cellular users were definitely interested in having a wireless PBX at their place of work. This demands increases to 10 percent of cellular users if the system offered both private in-building wireless PBX and access to cellular on the same handset.

While any technology should be able to offer combined wireless PBX, public wireless services, new PCS may have a unique advantage with this service concept due to the unlicensed bands allocated adjacent to the new PCS frequencies.

In EMCI's recent study, PCS Market Demand and System Engineering, the economics of PCS licenses were analyzed in every MTA and BTA market.

The highlights of the study are: While virtually

all MTA licenses appear voluble, there is tremendous variance of economic performance. The variance is related to the distribution and density of demand and local network design challenges due to the market's topography.

Many 20 megahertz BTA licenses appear to be viable as a stand-alone, high mobility, PCS business, particularly in the large urban markets. A large majority of the 10 megahertz licenses do not appear to be viable without substantial support from subsidy from a related wireless enterprise.

In conclusion, the wireless market should achieve 87 million voice subscribers by the year 2004. It will be additional messaging and unlicensed users. Delays in licensing PCS will have a negative impact.

I will continue with the conclusions following the discussion.

DR. PEPPER: Thank you very much.

Dr. Waylon.

DR. C.J. WAYLON

EXECUTIVE VICE PRESIDENT

MARKETING AND BUSINESS DEVELOPMENT

GTE PERSONAL COMMUNICATIONS SERVICES

DR. WAYLON: I would like to thank the Commission for the opportunity to offer comment on such an important hearing.

I'm Jerry Waylon, and I'm Executive Vice President, Marketing and Business Development, for GTE Personal Communications. I'm responsible for GTE's new wireless voice and data services, including our planning for PCS, using the new 2 gigahertz frequencies, as well as the PCS activities using existing cellular frequencies.

Today I would like to discuss PCS demand within the context of GTE's extensive marketing field trial of PCS using cellular frequencies in Tampa.

First, some general observations.

We believe that PCS will attract users wanting an improved lifestyle. PCS offers something new: the ability to call a person and not a place. PCS and cellular might be considered part of a family of services, encompassing voice, data and imaging applications. By the year 2005, we expect total wireless services, including PCS and cellular, to reach some 30 percent of the population.

This translates into market penetration of approximately 70 percent of households. Our prediction falls well within the range that's narrowing of other PCS demand forecasts.

However, it is important to point out that these projections are highly dependent upon the assumption that the services truly meet market needs. In large part, achieving these demand predictions will depend on the marketing savvy of GTE and its competitors, but it will be influenced substantially by the decisions of this Commission.

GTE completed an extensive market trial late last year in which we attempted to establish better understanding of these market needs. For 18 months, our Telego trial sold 3,000 customers a wireless phone which operated as an enhanced cordless phone around the home and as a cellular home when using the local cellular system beyond this coverage. Importantly, the phones maintained the same telephone number regardless of the location.

In conducting the trial, we encountered several significant hurdles.

First: We found that residential market segment

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Telego pricing needs to be simple and
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...ly support our 30 percent penetration estimate,

but let me emphasize again this estimate assumes that the key elements of the service are understood, addressed, and brought into line with the customer's expectations.

Ultimately, then, the issue before the Commission is not whether the inherent demand for PCS exists -- it does; rather, how can the FCC bring PCS to the public in the most time-efficient and cost-efficient manner without impeding the ability of any supplier to anticipate and meet those customer expectations.

Obviously, the Commission should leave to individual companies the marketing, sales, and technology challenges. However, the FCC can do a great deal to speed innovation and deployment by establishing uniform rules and equal opportunities for all of the wireless participants.

No company should be constrained in its ability to anticipate market needs and to try to meet them in a timely fashion. In this regard, the Commission is to be commended for taking an important first step in the regulatory parody decision.

GTE looks forward to equal regulatory treatment of cellular, ESMR, and PCS-providers, all of whom serve a

single, very large market.

Finally, the FCC has the opportunity to review important market structure issues which will affect the technology deployment and service pricing aspects so critical to serving its PCS market.

We believe that the 2 30 megahertz licenses, defined by the Rand-Minally MTAs, are without question the most valuable. 30 megahertz, in our opinion, is very generous. In fact, 30 megahertz is so generous it may encourage some license winners to deploy spectrally-inefficient technologies.

Finally, the MTA coverage both offers generously large geographic service area, which is both consistent with competing with the communities of interest and with the much smaller MSAs and RSAs that the cellular carriers and ESMR providers have.

By contrast, we believe that the 10 megahertz licenses will be considerably lower in value. Indeed, perhaps of no value, in many smaller markets. The much smaller bandwidth will make it difficult to achieve a user base to cover fixed costs. While the BTA geography offers the advantage of being larger than cellular MSAs and RSAs,

it may be too small to permit effective competition against significantly larger 30 megahertz licensees.

These differences between a 10 and 30 megahertz license are important, especially as they affect the provider's ability to meet the features and prices demanded by the marketplace.

We, therefore, encourage the Commission to review its present PCS market structure and the recommendations submitted by GTE, the Cellular Telecommunications Industry Association, and others.

All service providers must have the same flexibility and opportunity to respond to the customer needs. Uniform 20 megahertz allocations will best provide this opportunity and will ensure that the Commission's objectives for providing consumers timely and cost-efficient PCS are met.

Thank you.

DR. PEPPER: Thank you very much.

PANEL DISCUSSION

DR. PEPPER: One of the things that I think we are hearing among the presenters is that there is a lot of agreement but there are also some wide variances in terms

of predicted demand for these services, ranging from -- well, they all seem fairly high -- about a third of the persons -- 70 percent of the households -- we have 87 million voice customers; and then I think at one point -- Tom didn't talk about it, but in an earlier study submitted by PCIA, 167 million PCS subscribers.

Could you maybe talk a little bit about where you see the differences in the demand or why there are these differences, and is it the result of different definitions of PCS?

We also heard from Mr. Lowenstein that PCS is not a distinct market from the wireless market more generally, and yet we're hearing slightly different things from different panelists.

Mark, you might want to start.

MR. LOWENSTEIN: By that comment, I really meant that we see that there are currently PCS services available in the marketplace today. I think one can argue that elements of certain cellular services that are available, such as I mentioned the Bell Atlantic Contact Line service, for example, we would characterize as PCS. We would characterize some enhanced paging services that

some of what is envisioned for
d PCS services that are being
the new spectrum that's been
band PCS.
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solutions for a lot of the existing
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.bed, for instance, by Mr. Waylon, of the
:rvice.
some of those services could be offered over
spectrum, some of them could be offered over
censed PCS spectrum at 2 gigahertz.
ıso, it's important to recognize that there are
PCS that I think are very difficult to

predict, such as the more data-oriented PCS services that not a lot of us have really focussed on in the discussion so far.

So, for example, if the market for PDAs -- or Personal Intelligent Communicators -- takes off, and they have wireless communications capabilities, they are going to require a network infrastructure over which to send the myriad wireless messages that the applications are being developed for.

We see that there are a lot of kind of overlapping and complementary issues, and that's part of the way we forecast the market.

We do have, of the 25 million number that we posited for 1998, a specific segment that is newly-licensed, voice-oriented PCS at 2 gig, which is about 2.6 million in 1998.

DR. PEPPER: So about 10 percent of what you're predicting is the total market?

MR. LOWENSTEIN: Of the total PCS market --

DR. PEPPER: The total PCS market.

MR. LOWENSTEIN: -- is voice-oriented PCS services at 2 gigahertz.

DR. PEPPER: Mr. Kerr, would you agree with that?

MR. KERR: Overall, we see new PCS taking about a 25 percent market share, going at year 10, assuming a start date of '95, taking us to the year 2004.

I think the real critical issue is there's a gap emerging between the technology vision of anywhere, anytime, to anything, personal number, accessible at all times, and the realities of what the consumer market are willing to pay for.

A lot of our research has shown that the consumers want wireless pots. They don't want a lot of bells and whistles and, more importantly, they're not willing to pay for a lot of bells and whistles, at least initially. Part of the issue is, if I may, a customer on cellular today, for example, I'm typically not receiving a lot of calls because I'm scared to death to give my number out because my bill's going to shoot through the roof, which is just a fact of life of cellular today, or wireless today, not to pick on the cellular industry.

But the consumer market is not receiving a lot of calls; they're not giving their phone numbers out; and

so essentially, if we look to the future, what they want is a more cost-effective, wireless voice solution.

They're likely to adopt PCS for their convenience to make outgoing calls. The ability to receive calls is important. Don't get me wrong. That is a feature that they want, but most consumers that we spoke to are not envisaging receiving lots of calls. If you're not receiving lots of calls, you're not aware that you have a need for advance call screening, call management, default to voice mail, and so on.

So we have this gap between high envision of intelligent network services and the consumer market, which wants a cheap voice service, and somewhere in between there new service providers have to find a way to profitably serve a segment with reasonable revenue lines while developing the consumer market awareness and, over time, second generation PCS, then we'll see demand for some of these advanced features.

So I think it's important to focus in on the pricing, positioning, and marketing factors for PCS and not get too carried away with the technology side of the equation.

DR. PEPPER: So you're really seeing about within 10 years 2-1/2 million customers for PCS voice services, and you're looking at what projections for the cellular market for similar services at that time?

MR. KERR: If we look out over that time frame, cellular will have a total of 30 million subscribers. Paging will be running in the 20 to 21 million range.

And there is a lot of substitution or far gone growth in both cellular and paging, at least initially, so in the year 2004 cellular is still the largest market, with approximately a 60 percent share of revenues, PCS takes about 25 percent of revenues, and the balance, in our definition, coming from paging services.

Now I have not addressed the unlicensed market opportunity, which we see as a discrete opportunity, at least initially.

BIS is in the process of completing a demand study for the unlicensed industry on behalf of you, Tom, and that will be completed shortly. So this is just the licensed PCS market that we're addressing.

DR. PEPPER: Does anybody want to comment on what Mr. Kerr said?

Yes.

MR. TWYBER: I agree it's a matter of definition. Really, the only two markets that are defined now that you can go and ask intelligent questions about are cellular-like services and cordless-like services. All of the other anticipated and projected applications, it's very difficult to go out and find out an educated consumer base that could help you with those market forecasts.

If you just look at those two, cellular-like services at 2 gigahertz, I think we show the same kind of numbers with others here. We're looking at about 8-1/2 million subscribers in 1998 versus 33 or so in the cellular industry at that time, so 20, 25 percent of cellular-like, high mobility, wide coverage subscribers will be at 2 gig.

On the unlicensed side, where you can actually go and ask questions about how cordlessness would benefit users in offices and hospitals, and so on, we found a similar kind of number, about 9 million subscribers, by 1998, on about 8 percent of the PBXes in the U.S., we would find about 9 million subscribers.

So on top of that are all of the potential applications, and wireless access, wireless plots, PDAs, data, and so on.

But, just given those two sets of numbers, on the well understood markets, I think it's a tremendous opportunity.

MR. HALLER: Could I expand on that a little bit.

You draw a big distinction between licensed and unlicensed services. I'm curious. Do you think that it would be economically feasible for someone on the unlicensed spectrum to provide a full feature PCS kind of service without having to have the same kinds of build-out as a license, the same obligations?

Is it really possible to provide a competitive service on the unlicensed or is it truly complementary to the license?

MR. TWYBER: I think it's largely complementary. I mean, you could envision an unlicensed service where the provider -- somebody put unlicensed PCS in their hospital, for example, or in their office building; was able to use that spectrum without anything more than the coordination

that you're expecting, and yet their users, their employees, could use that terminal home for cordless applications, perhaps with some converter boxes and wire and things.

I don't think it's immediately obvious how you could provide a public kind of service with that technology, but you could certainly provide more than just residential cordless or office cordless.

DR. PEPPER: Are there other questions from people?

THE CHAIRMAN: Could I ask a question?

DR. PEPPER: Sure.

THE CHAIRMAN: This is just to focus my understanding a little bit.

Mr. Hamilton, you said in your submission, and I think you had time before the bell or say orally, that you project the total U.S. mobile telephone voice market will reach 87 million subscriptions by the year 2004.

MR. HAMILTON: That's correct.

THE CHAIRMAN: That number included cellular SMR and PCS. Is that correct?

MR. HAMILTON: That's correct.

THE CHAIRMAN: I think it was you, Mr. Kerr, who said that PCS represents a market that you would predict would support 17 million subscribers by the year 2004. Do I have that right?

MR. KERR: Correct.

THE CHAIRMAN: Now, just let me see if I have this right.

Mr. Hamilton, you said that 32 percent of your 87 million, which my math says is 29 million, would be the PCS market.

MR. HAMILTON: Yes.

THE CHAIRMAN: Is that the right number to compare to your 17 million, Mr. Kerr?

MR. KERR: Or 17 million is on a total base of 68 million users, including cellular paging and PCS.

THE CHAIRMAN: Is it right to understand, you and Mr. Hamilton to be saying separately, 29 million PCS, 17 million PCS?

MR. KERR: Correct.

THE CHAIRMAN: Could both of you please comment on the reasons for the difference?

MR. HAMILTON: Well, I would just like to add

that we see PCS having some unique advantages, which I would like to remark on. One of them will be the MTA license definitions. We believe the wide area -- starting out with a very wide area license -- will give them an advantage over some of the other industries, starting out.

There's no need to aggregate a lot of licenses, like the cellular industry is still doing, trying to get that area needed, that consumers want, without having to do all of the roaming which we have seen to be a negative with the cellular industry.

We also see the unlicensed PCS bands as really, again, being a real positive for the PCS. I agree with Dave Twyber, as far as we see it's a complementary service.

We see the unlicensed and licensed operators getting together, having a marriage of services, and that will really be a critical difference between the cellular industry, the SMR industry, and even the paging industry.

THE CHAIRMAN: Do I understand you to be saying these are perceptions of the future for PCS that you believe Mr. Kerr does not share, and that accounts for the

12 million extra subscribers in your prediction?

MR. HAMILTON: I can't comment on his.

THE CHAIRMAN: Are you saying you don't know why he's at 17 million?

MR. HAMILTON: Yes. I mean, I absolutely don't know.

THE CHAIRMAN: Do you know why you're at 17 million and he's at 29 million?

MR. KERR: I know why I'm at 17 million.

[Laughter]

I guess our view of PCS, actually, the opportunity there has diminished over time as the market has developed. A large reason for our increased conservatism on PCS relates to the fact that we do not see how all of the allocations can be filled in all markets.

Further, with such a potentially crowded environment, particularly in the top 10, 15 MTAs, it's going to be a very tough market to make money in. At the end of a day, despite looking at the range of services and the public good, people do not commit capital and deploy networks and run services if they're not going to get a return on that investment.

Part of our conservatism stems from the fact that we see a tremendous concentration in the top 10 or 15 MTAs, which will be hotly contested. Outside of that, we think it will be very difficult to raise capital in many markets.

Some potential service providers who do not win the 30 meg allocations, are likely to sit back and wait until an inevitable consolidation happens and pick up the spectrum at cutaway prices.

So what we see as a staged development, ultimately, we still think there's a tremendous opportunity for PCS, but what we see as an extension of a timeline. Because the market in which you have potentially seven allocations competing for a set of customers; on one hand you have consumers who have not demonstrated a willingness to pay significant premiums for enhanced features.

On the other hand, you have the business market segment who everybody is going to be trying to focus on because of their highly monthly billings; it leads to a situation where the rate of adoption and the rate of inexpensive consumer market services will be slowed down.